

WHAT IS CLAIMED IS:

1. A first node among a plurality of distributed nodes capable of forming or reforming a communication network between the plurality of distributed nodes, each of the plurality of distributed nodes comprising functionally similar components for forming or reforming such a network, the first node comprising:
 - a memory for storing values for one or more node variables for the first node; and
 - one or more components collectively operable to:
 - spontaneously and independent of a centralized controller associated with the network, transmit a probe message to one or more other nodes in the plurality of distributed nodes for purposes of forming or reforming a network;
 - receive a probe message from a second node, the probe message comprising values for the one or more node variables for the second node;
 - compare the values for the one or more node variables for the first node to the values for the one or more node variables for the second node within the probe message to determine, independent of a centralized controller associated with the network, whether the first node should set itself to a new channel; and
 - if it is determined that the first node should set itself to the new channel, set the first node to the new channel.
2. The first node of Claim 1, wherein the one or more node variables for a node comprise:
 - a home channel variable identifying whether the node currently has a home channel on which the node has data-plane connectivity with other nodes within a node group of the node and, if so, identifying the home channel of the node; and
 - a switch count variable reflecting a number of times that the node has changed home channels.
3. The first node of Claim 2, further operable to set the value for the switch count variable for the first node to zero if the first node does not currently have a home channel.

4. The first node of Claim 2, further operable to, if the first node currently has a home channel and the second node does not currently have a home channel, communicate a probe message to the second node in response to the probe message received from the second node to prompt the second node to switch to the current home channel of the first node.

5. The first node of Claim 2, further operable to, if the first node currently has a home channel, if the second node currently has a home channel, and if the value for the switch count variable for the first node is greater than the value for the switch count variable for the second node, communicate a probe message to the second node in response to the probe message received from the second node, the second node processing the probe message communicated to the second node to determine whether the second node should set itself to the current home channel of the first node.

6. The first node of Claim 2, further operable to, whether or not the first node currently has a home channel, if the second node currently has a home channel and the value for the switch count variable for the first node is less than the value for the switch count variable for the second node:

set the first node to the home channel of the second node; and

set the value for the switch count variable for the first node to the value for the switch count variable for the second node.

7. The first node of Claim 2, further operable to, if the first node currently has a home channel, if the second node currently has a home channel, if the value for the switch count variable of the first node is equal to the value for the switch count variable for the second node, and if the value for the home channel variable for the first node is different than the value for the home channel variable for the second node:

set the first node to the home channel of the second node; and

increment the value for the switch count variable for the first node.

8. The first node of Claim 2, further operable to, if the first node does not currently have a home channel, if the second node currently has a home channel, and if the value for the switch count variable for the first node is greater than or equal to the value for the switch count variable for the second node:

5 set the first node to the home channel of the second node; and
 increment the value for the switch count variable for the first node.

9. The first node of Claim 2, further operable to discard the probe message if one or more of the following conditions is true:

10 a switch count difference determined after receipt of the probe message is greater than a predetermined switch count difference threshold, the switch count difference being a difference between the value for the switch count variable for the first node and the value for the switch count variable for the second node;

 the first node does not currently have a home channel and the second node
15 does not currently have a home channel; and

 the value for the switch count variable for the first node is equal to the value for the switch count variable for the second node and the value for the home channel variable for the first node is equal to the value for the home channel variable of the second node.

20

10. The first node of Claim 2, wherein:

 the one or more node variables further comprise a rank variable; and

 the first node is further operable to compare a value for the rank variable for the first node to a value for the rank variable for the second node if the value for the switch count variable for the first node matches the value for the switch count variable for the second node, this comparison being used to determine whether the first node
25 should set itself to the new channel.

11. The first node of Claim 10, further operable to randomize the rank
30 variable upon the occurrence of one or more conditions.

12. The first node of Claim 1, further operable to, if it is determined that the first node should not set itself to the new channel, discard the probe message received from the second node.

5 13. The first node of Claim 1, wherein if the first node currently has a home channel and it is determined that the first node should not set itself to the new channel, then the first node remains on its home channel.

10 14. The first node of Claim 1, further operable to, if the first node currently has a home channel and it is determined that the first node should not set itself to a new channel, communicate a probe message to the second node.

15 15. The first node of Claim 1, further operable to, if the first node does not currently have a home channel on which the first node has data-plane connectivity with one or more other nodes within a node group of the first node, spontaneously transmit, independent of receiving the probe message from the second node, one or more probe messages to one or more other nodes in the plurality of distributed nodes for purposes of determining an initial channel on which to form a network.

20 16. The first node of Claim 1, further operable to, if the first node has a current home channel on which the first node has data-plane connectivity with one or more other nodes within a node group of the first node, communicate a notification to the other nodes within the node group on the current home channel of the first node if it is determined that the first node should set itself to the new channel, the notification
25 indicating to the other nodes that the first node is setting itself to the new channel.

17. The first node of Claim 1, wherein:

a home channel of a node comprises a channel that provides data-plane connectivity between the node and one or more other nodes within a node group of the node;

5 a visited channel of a node comprises a channel that provides temporary control-plane connectivity between the node and one or more other nodes for purposes of transmitting or receiving one or more probe messages to the other nodes, and

one of the following is true:

10 the first node currently has a home channel that is a current visited channel of the second node;

the first node currently has a home channel that is a current home channel of the second node;

15 the first node currently has a visited channel that is a current home channel of the second node; and

the first node currently has a visited channel that is a current visited channel of the second node.

18. The first node of Claim 1, further operable to, if the first node currently has a home channel, spontaneously transmit, independent of receiving the probe message from the second node, one or more probe messages to one or more other nodes in the plurality of distributed nodes in one or more of the following situations:

5 the one or more other nodes to which the one or more probe messages are spontaneously transmitted are not on the home channel of the first node, the one or more probe messages being spontaneously transmitted for purposes of:

determining whether the first node should change its current home channel; or

10 scanning channels other than the current home channel of the first node for other nodes to which to transmit probe messages; and

the one or more other nodes to which the one or more probe messages are spontaneously transmitted currently have the same home channel as the first node, the one or more probe messages being spontaneously transmitted for purposes of
15 transmitting a beacon on the current home channel of the first node.

19. The first node of Claim 1, wherein the communication network comprises a wireless ad-hoc network, the first node comprising a channel-agile mobile terminal within the wireless ad-hoc network.

20. The first node of Claim 1, wherein the communication network comprises a wireless infrastructure network, the first node comprising either a mobile station or a base station within the wireless infrastructure network.

25 21. The first node of Claim 1, further operable to:
determine one or more channels available to be scanned for purposes of forming or reforming a network; and

order the available channels for purposes of, if the available channel is determined to be usable, spontaneously transmitting one or more probe messages to
30 one or more other nodes on the available channel.

22. The first node of Claim 21, further operable to, if the first node currently has a home channel, scan one or more of the available channels other than the current home channel of the first node in response to the first node determining that its current home channel is invalid.

5

23. The first node of Claim 22, further operable to, if the first node fails to locate another node on an available channel while scanning the one or more available channels in response to the first node determining that its current home channel is invalid, set a next in-sequence channel that is determined to be usable as the next home channel of the first node.

10

24. A method performed at a first node among a plurality of distributed nodes, the first node capable of forming or reforming a communication network between the plurality of distributed nodes, each of the plurality of distributed nodes comprising functionally similar components for forming or reforming such a network,
5 the method comprising:

storing values for one or more node variables for the first node;

spontaneously and independent of a centralized controller associated with the network, transmitting a probe message to one or more other nodes in the plurality of distributed nodes for purposes of forming or reforming a network;

10 receiving a probe message from a second node, the probe message comprising values for the one or more node variables for the second node;

comparing the values for the one or more node variables for the first node to the values for the one or more node variables for the second node within the probe message to determine, independent of a centralized controller associated with the network, whether the first node should set itself to a new channel; and
15

if it is determined that the first node should set itself to the new channel, setting the first node to the new channel.

25. The method of Claim 24, wherein the one or more node variables for a
20 node comprise:

a home channel variable identifying whether the node currently has a home channel on which the node has data-plane connectivity with other nodes within a node group of the node and, if so, identifying the home channel of the node; and

25 a switch count variable reflecting a number of times that the node has changed home channels.

26. The method of Claim 25, further comprising setting the value for the switch count variable for the first node to zero if the first node does not currently have a home channel.

27. The method of Claim 25, further comprising, if the first node currently has a home channel and the second node does not currently have a home channel, communicating a probe message to the second node in response to the probe message received from the second node to prompt the second node to switch to the current home channel of the first node.

28. The method of Claim 25, further comprising, if the first node currently has a home channel, if the second node currently has a home channel, and if the value for the switch count variable for the first node is greater than the value for the switch count variable for the second node, communicating a probe message to the second node in response to the probe message received from the second node, the second node processing the probe message communicated to the second node to determine whether the second node should set itself to the current home channel of the first node.

29. The method of Claim 25, further comprising, whether or not the first node currently has a home channel, if the second node currently has a home channel and the value for the switch count variable for the first node is less than the value for the switch count variable for the second node:

setting the first node to the home channel of the second node; and
setting the value for the switch count variable for the first node to the value for the switch count variable for the second node.

30. The method of Claim 25, further comprising, if the first node currently has a home channel, if the second node currently has a home channel, if the value for the switch count variable for the first node is equal to the value for the switch count variable for the second node, and if the value for the home channel variable for the first node is different than the value for the home channel variable for the second node:

setting the first node to the home channel of the second node; and
incrementing the value for the switch count variable for the first node.

31. The method of Claim 25, further comprising, if the first node does not currently have a home channel, if the second node currently has a home channel, and if the value for the switch count variable for the first node is greater than or equal to the value for the switch count variable for the second node:

5 setting the first node to the home channel of the second node; and
 incrementing the value for the switch count variable for the first node.

32. The method of Claim 25, further comprising discarding the probe message if one or more of the following conditions is true:

10 a switch count difference determined after receipt of the probe message is greater than a predetermined switch count difference threshold, the switch count difference being a difference between the value for the switch count variable for the first node and the value for the switch count variable for the second node;

 the first node does not currently have a home channel and the second node
15 does not currently have a home channel; and

 the value for the switch count variable for the first node is equal to the value for the switch count variable for the second node and the value for the home channel variable for the first node is equal to the value for the home channel variable of the second node.

20

33. The method of Claim 25, wherein:

 the one or more node variables further comprise a rank variable; and

 the method further comprises comparing a value for the rank variable for the first node to a value for the rank variable for the second node if the value for the switch count variable for the first node matches the value for the switch count variable for the second node, this comparison being used to determine whether the first node
25 should set itself to the new channel.

34. The method of Claim 33, further comprising randomizing the value for
30 the rank variable upon the occurrence of one or more conditions.

35. The method of Claim 24, further comprising, if it is determined that the first node should not set itself to the new channel, discarding the probe message received from the second node.

5 36. The method of Claim 24, wherein if the first node currently has a home channel and it is determined that the first node should not set itself to the new channel, then the first node remains on its home channel.

10 37. The method of Claim 24, further comprising, if the first node currently has a home channel and it is determined that the first node should not set itself to a new channel, communicating a probe message to the second node.

15 38. The method of Claim 24, further comprising, if the first node does not currently have a home channel on which the first node has data-plane connectivity with one or more other nodes within a node group of the first node, spontaneously transmitting, independent of receiving the probe message from the second node one or more probe messages to one or more other nodes in the plurality of distributed nodes for purposes of determining an initial channel on which to form a network.

20 39. The method of Claim 24, further comprising, if the first node currently has a home channel on which the first node has data-plane connectivity with one or more other nodes within a node group of the first node, communicating a notification to the other nodes within the node group on the current home channel of the first node if it is determined that the first node should set itself to the new channel, the
25 notification indicating to the other nodes that the first node is setting itself to the new channel.

40. The method of Claim 24, wherein:

a home channel of a node comprises a channel that provides data-plane connectivity between the node and one or more other nodes within a node group of the node;

5 a visited channel of a node comprises a channel that provides temporary control-plane connectivity between the node and one or more other nodes for purposes of transmitting or receiving one or more probe messages to the other nodes, and

one of the following is true:

10 the first node currently has a home channel that is a current visited channel of the second node;

the first node currently has a home channel that is a current home channel of the second node;

15 the first node currently has a visited channel that is a current home channel of the second node; and

the first node currently has a visited channel that is a current visited channel of the second node.

41. The method of Claim 24, further comprising, if the first node currently has a home channel, spontaneously transmitting, independent of receiving the probe message from the second node, one or more probe messages to one or more other nodes in the plurality of distributed nodes in one or more of the following situations:

5 the one or more other nodes to which the one or more probe messages are spontaneously transmitted are not on the home channel of the first node, the one or more probe messages being spontaneously transmitted for purposes of:

determining whether the first node should change its current home channel; or

10 scanning channels other than the current home channel of the first node for other nodes to which to transmit probe messages; and

the one or more other nodes to which the one or more probe messages are spontaneously transmitted currently have the same home channel as the first node, the one or more probe messages being spontaneously transmitted for purposes of
15 transmitting a beacon on the current home channel of the first node.

42. The method of Claim 24, wherein the communication network comprises a wireless ad-hoc network, the first node comprising a channel-agile mobile terminal within the wireless ad-hoc network.

20

43. The method of Claim 24, wherein the communication network comprises a wireless infrastructure network, the first node comprising either a mobile station or a base station within the wireless infrastructure network.

25

44. The method Claim 24, further comprising:

determining one or more channels available to be scanned for purposes of forming or reforming a network; and

30

ordering the available channels for purposes of, if the available channel is determined to be usable, spontaneously transmitting one or more probe messages to one or more other nodes on the available channel.

45. The method of Claim 44, further comprising, if the first node currently has a home channel, scanning one or more of the available channels other than the current home channel of the first node in response to the first node determining that its current home channel is invalid.

5

46. The method of Claim 45, further comprising, if the first node fails to locate another node on an available channel while scanning the one or more available channels in response to the first node determining that its current home channel is invalid, setting a next in-sequence channel that is determined to be usable as the next home channel of the first node.

10

47. Software associated with a first node among a plurality of distributed nodes, the first node capable of forming or reforming a communication network between the plurality of distributed nodes, each of the plurality of distributed nodes comprising functionally similar components for forming or reforming such a network, the software being embodied in computer-readable media and when executed operable to:

store values for one or more node variables for the first node;

spontaneously and independent of a centralized controller associated with the network, transmit a probe message to one or more other nodes in the plurality of distributed nodes for purposes of forming or reforming a network;

receive a probe message from a second node, the probe message comprising values for the one or more node variables for the second node;

compare the values for the one or more node variables for the first node to the values for the one or more node variables for the second node within the probe message to determine, independent of a centralized controller associated with the network, whether the first node should set itself to a new channel; and

if it is determined that the first node should set itself to the new channel, set the first node to the new channel.

48. The software of Claim 47, wherein the one or more node variables for a node comprise:

a home channel variable identifying whether the node currently has a home channel on which the node has data-plane connectivity with other nodes within a node group of the node and, if so, identifying the home channel of the node; and

a switch count variable reflecting a number of times that the node has changed home channels.

49. The software of Claim 48, further operable to set the value for the switch count variable for the first node to zero if the first node does not currently have a home channel.

50. The software of Claim 48, further operable to, if the first node currently has a home channel and the second node does not currently have a home channel, communicate a probe message to the second node in response to the probe message received from the second node to prompt the second node to switch to the current home channel of the first node.

51. The software of Claim 48, further operable to, if the first node currently has a home channel, if the second node currently has a home channel, and if the value for the switch count variable for the first node is greater than the value for the switch count variable for the second node, communicate a probe message to the second node in response to the probe message received from the second node, the second node processing the probe message communicated to the second node to determine whether the second node should set itself to the current home channel of the first node.

52. The software of Claim 48, further operable to, whether or not the first node currently has a home channel, if the second node currently has a home channel and the value for the switch count variable for the first node is less than the value for the switch count variable for the second node:

set the first node to the home channel of the second node; and
set the value for the switch count variable for the first node to the value for the switch count variable for the second node.

53. The software of Claim 48, further operable to, if the first node currently has a home channel, if the second node has a home channel, if the value for the switch count variable for the first node is equal to the value for the switch count variable for the second node, and if the value for the home channel variable for the first node is different than the value for the home channel variable for the second node:

set the first node to the home channel of the second node; and
increment the value for the switch count variable for the first node.

54. The software of Claim 48, further operable to, if the first node does not currently have a home channel, if the second node currently has a home channel, and if the value for the switch count variable for the first node is greater than or equal to the value for the switch count variable for the second node:

5 set the first node to the home channel of the second node; and
 increment the value for the switch count variable for the first node.

55. The software of Claim 48, further operable to discard the probe message if one or more of the following conditions is true:

10 a switch count difference determined after receipt of the probe message is greater than a predetermined switch count difference threshold, the switch count difference being a difference between the value for the switch count variable for the first node and the value for the switch count variable for the second node;

 the first node does not currently have a home channel and the second node
15 does not currently have a home channel; and

 the value for the switch count variable for the first node is equal to the value for the switch count variable for the second node and the value for the home channel variable for the first node is equal to the value for the home channel variable for the second node.

20

56. The software of Claim 48, wherein:

 the one or more node variables further comprise a rank variable; and

 the software is further operable to compare a value for the rank variable for the first node to a value for the rank variable for the second node if the value for the switch count variable for the first node matches the value for the switch count variable for the second node, this comparison being used to determine whether the first node
25 should set itself to the new channel.

57. The software of Claim 56, further operable to randomize the rank
30 variable upon the occurrence of one or more conditions.

58. The software of Claim 47, further operable to, if it is determined that the first node should not set itself to the new channel, discard the probe message received from the second node.

5 59. The software of Claim 47, wherein if the first node currently has a home channel and it is determined that the first node should not set itself to the new channel, then the first node remains on its home channel.

10 60. The software of Claim 47, further operable to, if the first node currently has a home channel and it is determined that the first node should not set itself to a new channel, communicate a probe message to the second node.

15 61. The software of Claim 47, further operable to, if the first node does not currently have a home channel on which the first node has data-plane connectivity with one or more other nodes within a node group of the first node, spontaneously transmit, independent of receiving the probe message from the second node, one or more probe messages to one or more other nodes in the plurality of distributed nodes for purposes of determining an initial channel on which to form a network.

20 62. The software of Claim 47, further operable to, if the first node currently has a home channel on which the first node has data-plane connectivity with other nodes within a node group of the first node, communicate a notification to the other nodes within the node group on the current home channel of the first node if it is determined that the first node should set itself to the new channel, the notification
25 indicating to the other nodes that the first node is setting itself to the new channel.

63. The software of Claim 47, wherein:

a home channel of a node comprises a channel that provides data-plane connectivity between the node and one or more other nodes within a node group of the node;

5 a visited channel of a node comprises a channel that provides temporary control-plane connectivity between the node and one or more other nodes for purposes of transmitting or receiving one or more probe messages to the other nodes, and

one of the following is true:

10 the first node currently has a home channel that is a current visited channel of the second node;

the first node currently has a home channel that is a current home channel of the second node;

15 the first node currently has a visited channel that is a current home channel of the second node; and

the first node currently has a visited channel that is a current visited channel of the second node.

64. The software of Claim 47, further operable to, if the first node currently has a home channel, spontaneously transmit, independent of receiving the probe message from the second node, one or more probe messages to one or more other nodes in the plurality of distributed nodes in one or more of the following situations:

the one or more other nodes to which the one or more probe messages are spontaneously transmitted are not on the home channel of the first node, the one or more probe messages being spontaneously transmitted for purposes of:

determining whether the first node should change its current home channel; or

scanning channels other than the current home channel of the first node for other nodes to which to transmit probe messages; and

the one or more other nodes to which the one or more probe messages are spontaneously transmitted currently have the same home channel as the first node, the one or more probe messages being spontaneously transmitted for purposes of transmitting a beacon on the current home channel of the first node.

65. The software of Claim 47, wherein the communications network comprises a wireless ad-hoc network, the first node comprising a channel-agile mobile terminal within the wireless ad-hoc network.

66. The software of Claim 47, wherein the communication network comprises a wireless infrastructure network, the first node comprising either a mobile station or a base station within the wireless infrastructure network.

67. The software of Claim 47, further operable to:
determine one or more channels available to be scanned for purposes of forming or reforming a network; and

order the available channels for purposes of, if the available channel is determined to be usable, spontaneously transmitting one or more probe messages to one or more other nodes on the available channel.

68. The software of Claim 67, further operable to, if the first node currently has a home channel, scan one or more of the available channels other than the current home channel of the first node in response to the first node determining that its current home channel is invalid.

5

69. The software of Claim 68, further operable to, if the first node fails to locate another node on an available channel while scanning the one or more available channels in response to the first node determining that its current home channel is invalid, set a next in-sequence channel that is determined to be usable as the next home channel of the first node.

10

70. A first node among a plurality of distributed nodes capable of forming or reforming a communication network between the plurality of distributed nodes, each of the plurality of distributed nodes comprising functionally similar components for forming or reforming such a network, the first node comprising:

5 means for storing values for one or more node variables for the first node;

means for, spontaneously and independent of a centralized controller associated with the network, transmitting a probe message to one or more other nodes in the plurality of distributed nodes for purposes of forming or reforming a network;

10 means for receiving a probe message from a second node, the probe message comprising values for the one or more node variables for the second node;

means for comparing the values for the one or more node variables for the first node to the values for the one or more node variables for the second node within the probe message to determine, independent of a centralized controller associated with the network, whether the first node should set itself to a new channel; and

15 means for, if it is determined that the first node should set itself to the new channel, setting the first node to the new channel.

71. A first node among a plurality of distributed nodes capable of forming or reforming a communication network between the plurality of distributed nodes, each of the plurality of distributed nodes comprising functionally similar components for forming or reforming such a network, the first node comprising:

5 a memory for storing values for node variables for the first node, the node variables for the first node comprising:

a home channel variable identifying whether the first node currently has a home channel on which the first node has data-plane connectivity with other nodes within a node group of the first node and, if so, identifying the home channel of the first node; and

10 a switch count variable reflecting a number of times that the first node has changed home channels, the first node operable to set the value for the switch count variable for the first node to zero if the first node does not currently have a home channel; and

15 one or more components collectively operable to:

spontaneously and independent of a centralized controller associated with the network, transmit a probe message to one or more other nodes in the plurality of distributed nodes for purposes of forming or reforming a network;

20 receive a probe message from a second node on a channel that provides temporary control-plane connectivity between the first and second nodes for communication of the probe message, the probe message comprising values for the node variables for the second node;

25 compare the values for the node variables for the first node to the values for the node variables for the second node within the probe message to determine, independent of a centralized controller associated with the network, whether the first node should set itself to a new channel;

30 whether or not the first node currently has a home channel, if the second node currently has a home channel and the value for the switch count variable for the first node is less than the value for the switch count variable for the second node:

set the first node to the home channel of the second node; and

set the value for the switch count variable for the first node to the value for the switch count variable for the second node;

5 if the first node currently has a home channel and the second node does not currently have a home channel, communicate a probe message to the second node in response to the probe message received from the second node to prompt the second node to switch to the current home channel of the first node;

10 if the first node currently has a home channel, if the second node currently has a home channel, and if the value for the switch count variable for the first node is greater than the value for the switch count variable for the second node, communicate a probe message to the second node in response to the probe message received from the second node, the second node processing the probe message communicated to the second node to determine whether the second node should set itself to the current home channel of the first node;

15 if the first node currently has a home channel, if the second node currently has a home channel, if the value for the switch count variable of the first node is equal to the value for the switch count variable for the second node, and if the value for the home channel variable for the first node is different than the value for the home channel variable for the second node:

20 set the first node to the home channel of the second node; and increment the value for the switch count variable for the first node; and

25 if the first node does not currently have a home channel, if the second node currently has a home channel, and if the value for the switch count variable for the first node is greater than or equal to the value for the switch count variable for the second node:

set the first node to the home channel of the second node; and increment the value for the switch count variable for the first node.